



LED Fixtures Cheaper, Safer, and Sustainable

At Caltrans, we are retrofitting our roadway lighting inventory with LED fixtures. High-pressure sodium fixtures have been the mainstay for Caltrans roadway lighting for 30 years, but they are being surpassed by LED as the state-of-the-art lighting technology. LED fixtures are helping us to reduce our maintenance efforts on lighting systems, improve safety for our employees and the public, and reduce our energy needs.

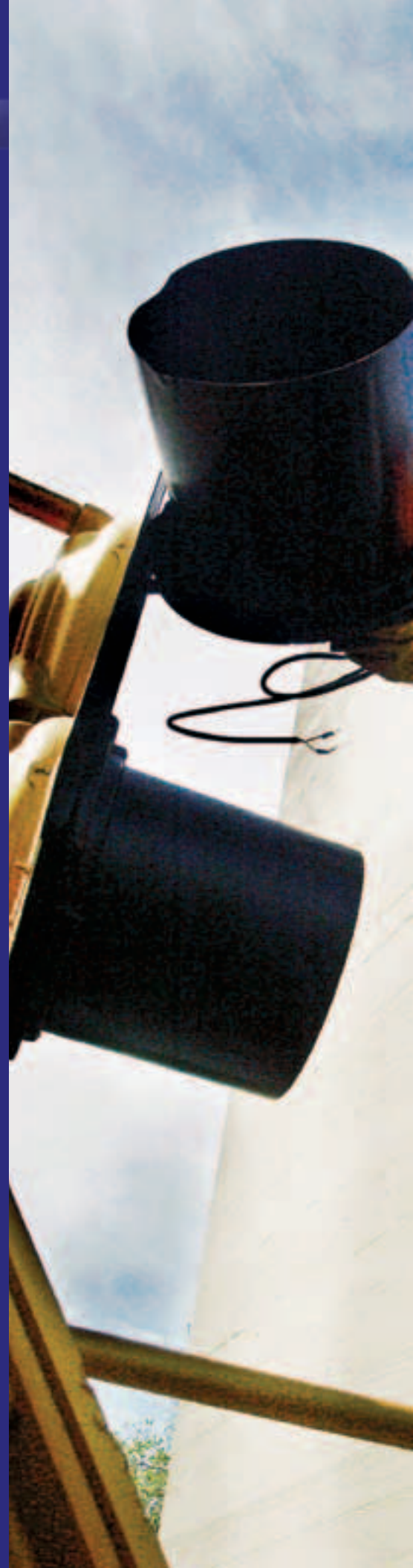
Highway Lighting Comes with Costs


Caltrans installs lighting on roadways to allow motorists to avoid other vehicles and obstacles in the roadway. Maintaining and operating these systems costs more than \$20 million annually and requires routine maintenance that often places workers at risk and interferes with traffic flow.

Benefits of LED Fixtures

LED fixtures are more robust and reliable, and that leads to a safer roadway system for motorists. LED roadway fixtures are designed to operate for a minimum of 15 years with little to no maintenance, while our current high-pressure sodium fixtures need to be relamped every four to five years. Reducing the need for maintenance on highway lighting means fewer lane closures are necessary. This translates to fewer motorists' delays, and it reduces our electricians' exposure to the hazards of working near live traffic. Our electricians in these positions can now focus their efforts on other high-priority work, such as maintaining ramp meters, freeway vehicle detection systems, and electronic highway message signs.

LED fixtures are a significant energy saver. LED fixtures reduce lighting energy needs by up to 50 percent. This savings results in a financial benefit to the citizens of California, as well as contributing to Caltrans' effort to reduce our greenhouse gas effects on the environment. Caltrans has a goal to reduce the department's





A Caltrans maintenance worker installs an LED fixture on Sacramento's Tower Bridge.

carbon dioxide equivalent, a measure used to compare emissions from various greenhouse gases based upon their global warming potential. We estimate that our fully retrofitted lighting inventory will reduce up to 20,000 tons of carbon dioxide equivalent per year. Our current retrofit effort will save enough energy to power more than 2,400 homes, and the annual greenhouse gas reduction is equivalent to taking more than 2,800 cars off the roads.

These savings, for both maintenance and energy, are part of the effort to reduce costs and ensure a sustainable highway system.

Caltrans LED Inventory, Savings, and Greenhouse Gas Reduction

	Up to 2012	2013	2014 (estimate)	2015 (estimate)	2016 (estimate)
Annual installed (or planned)	1,491	7,252	23,000	26,000	6,500+
Cumulative installations	1,491	8,743	31,743	57,743	64,243+
Annual energy savings (in kilowatt hours)	916,965	5,376,945	19,521,945	35,511,945	39,509,445+
Annual greenhouse gas reduction (in tons of carbon dioxide equivalent)	346	2,027	7,360	13,388	14,895+

Source: Division of Maintenance

Lighting the Future

We began our energy saving measures on roadways 10 years ago by converting more than 240,000 traffic signal lamps to LED technology. The first phase of this effort is focused on standard street lights, or “cobrahead” style fixtures. There are more than 64,000 of these types of fixtures on the state’s highways.

We started our LED retrofit in 2009, with installations on bridges and interchanges in the San Francisco Bay Area. In 2012, we purchased 50,000 fixtures, and we will be installing these fixtures over several years. Additional purchases are planned for fiscal year 2014–15, and we should complete the first part of the retrofit by fiscal year 2015–16.

While the cobrahead retrofit is being completed, we are writing specifications to convert the other types of lighting (such as tunnel lighting, sign lighting, and underpass lighting) to LED technology. This could add another 25,000 fixtures. We expect LED technology to be the lighting technology of choice for the foreseeable future.

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